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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,203	02/09/2004	Kia Silverbrook	MTB30US	8282

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SILVERBROOK RESEARCH PTY LTD
393 DARLING STREET
BALMAIN, NSW 2041
AUSTRALIA

EXAMINER

CHOI, HAN S

ART UNIT	PAPER NUMBER
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2853

DATE MAILED: 09/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/773,203	Applicant(s) SILVERBROOK, KIA	
	Examiner Han S. Choi	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/14/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimer filed on 7/5/06 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of USSN 10/773197 (Pub. No. US 2004/0155937) has been reviewed and is accepted. The terminal disclaimer has been recorded.

Response to Arguments

2. Applicant's arguments with respect to claims 1, 19, and 38 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-54 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claimed subject matter "an ejectable liquid inlet ... and laterally offset from, the nozzle axis" is not described within the

specification nor the drawings. The specification does describe the heater element being laterally offset from the ejectable liquid inlet, but there is no correlation found between the ejectable liquid inlet and the nozzle axis.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 5, 19, 23, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Moon et al. (US 2002/0008732).

Referring to claims 1 and 19:

- an inkjet printhead and a printer system shown in Fig. 4.
- a plurality of nozzles shown in Fig. 4.
- a nozzle aperture [16] with a nozzle axis extending through the center of the nozzle aperture [16] and normal to the nozzle aperture [16] in [Paragraph 0040] shown in Fig. 3.
- an ejectable liquid inlet [1'] for establishing fluid communication between the nozzle aperture [16] and an ejectable liquid supply, the inlet [1'] having a central axis substantially parallel, and laterally offset from, the nozzle axis in [Paragraph 0039] shown in Fig. 3.

- each nozzle having a respective bubble forming chamber [24] in [Paragraph 0039] shown in Fig. 3.
- a heater [12] disposed in each of the bubble forming chambers [24] respectively in [Paragraph 0039] shown in Fig. 3.
- at least one heater element [12] configured for thermal contact with a bubble forming liquid in [Paragraph 0040].
- heating the heater element [12] to a temperature above the boiling point of the bubble forming liquid in forms a gas bubble [19'] that causes the ejection of a drop of an ejectable liquid [19] through the nozzle corresponding to that heater element [12] shown in Fig. 3.
- the heater element [12] configured to nucleate the gas bubble [19'] at a point that is laterally offset from the inlet [1'] shown in Fig. 3

Referring to claims 5 and 24:

- wherein the bubble forming liquid and the ejectable liquid are of a common body of liquid shown in Fig. 3.

Referring to claim 23:

- to support the bubble forming liquid in thermal contact with each said heater element [12], and to support the ejectable liquid adjacent each nozzle shown in Fig. 3.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 6, 8, 13, 25, 27, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Silverbrook (US Pat. 5,841,452).

Moon et al. discloses the basic elements of the claimed invention except for being configured to print on a page and to be a page-width printhead of claims 6 and 25, wherein each heater element is configured such that an actuation energy of less than 500 nanojoules (nJ) is required to be applied to that heater element to heat that heater element sufficiently to form a said bubble in the bubble forming liquid thereby to cause the ejection of a said drop of claims 8 and 27, and a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure of claims 13 and 32.

Referring to claims 6 and 25, Silverbrook teaches the printhead configured to print on a page and to be a page-width printhead in [Col. 2, Lines 28-31]. Referring to claims 8 and 27, Silverbrook teaches typically 200 nanojoules is required to eject a drop by heating the heater element in [Col. 18, Lines 15-18]. Referring to claims 13 and 32, Silverbrook teaches a thick chemical vapor deposition (CVD) glass over coat [142] which forms the nozzle region in [Col. 9, Lines 57-58] shown in Fig. 12.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the requirement of applying a typical heating energy of 200 nanojoules, and a nozzle plate formed by chemical vapor deposition (CVD) of Silverbrook to the heating element and printhead of Moon et al. for placing an image on a sheet in a single pass, maintaining print speed while reducing power dissipation, and to provide mechanical strength to resist the shock of exploding or collapsing vapor bubbles and to provide protection against the external environment in [Col. 8, Lines 22-25].

9. Claims 11, 18, 30, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Kubby (US Pat. 5,706,041).

Moon et al. discloses the basic elements of the claimed invention except for the heater element having two opposite sides and configured such that a gas bubble formed by the heater element is formed at both of the sides of the heater element, supporting the bubble forming liquid in thermal contact with each heater element and ejectable liquid adjacent each nozzle, and the heater element substantially covered by a conformal protective coating, all sides of the coating being seamless.

Kubby teaches the heater element [20a and 20b] causing a gas bubble to be formed on both sides of the heater element [20a or 20b] in [Col. 4, Lines 59-63]. Kubby teaches a configuration to support the bubble forming liquid in thermal contact with each said heater element, and to support the ejectable liquid adjacent each nozzle in [Col. 3,

Lines 13-24] shown in Fig. 2. Kubby teaches a heater element [20a or 20b] that is substantially covered by a protective coating substantially to all sides, which are seamless in [Col. 4, Lines 32-50] shown in Fig. 4.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the elements taught by Kubby to the printhead of Moon et al. for the purpose of exposing both sides of the heater for vaporizing liquid ink, ejecting a sufficient amount of ink from the ejector, properly heating the ink, and protecting the heater.

10. Claims 7, 16, 26, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Chan (US Pat. 5,710,070).

Moon et al. discloses the basic elements of the claimed invention except for a heater element formed of solid material of which more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50 and the heater element being predominantly formed from titanium nitride.

Chan teaches a thermal inkjet printhead comprising a resistive layer composed of titanium nitride, which forms a resistor and a contact metal barrier layer in [Col. 2, Lines 10-14]. Titanium has an atomic number less than 50 on the periodic table.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the titanium nitride resistor to the printhead of Moon et al. for the purpose of having resistors that are more reliable, especially at higher temperatures and less complicated to manufacture.

11. Claims 10 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Feinn et al. (US Pat. 6,543,879).

Moon et al. discloses the basic elements of the claimed invention except for a nozzle density greater than 10000 nozzles/cm².

Feinn et al. of the acknowledged prior art teaches in [Col. 2, Lines 1-14] a nozzle packing density of at least 100 nozzles/mm², which is equal to 10000 nozzles/cm² when converted to square centimeters.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the nozzle density of Feinn et al. to the printhead of Moon et al. for the purpose of accommodating higher printing resolutions and to improve the printhead drop generation rate in [Col. 1, Lines 57-61].

12. Claims 14 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Kashino et al. (US Pat. 5,534,898).

Moon et al. discloses the basic elements of the claimed invention except for a nozzle plate of the printhead having a thickness of less than 10 microns.

Kashino et al. of the acknowledged prior art teaches a thickness of an orifice plate in the order of several microns in [Col. 6, Lines 34-41].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the thickness of the Kashino et al. nozzle plate to the Moon et al. printhead for the purpose of obtaining adequate values of the

velocity of the discharged ink droplets, amount of ink droplet and refilling frequency, and in consideration of the distance between the thermal energy generating element and the discharge port.

13. Claims 38 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Fukuchi et al. (US Pat. 4,549,191).

Referring to claim 38, Moon et al. discloses the basic elements of the claimed invention except for supplying the nozzle with a replacement volume of the ejectable liquid equivalent to the ejected drop. Referring to claim 42, Moon et al. teaches the bubble forming liquid and the ejectable liquid are of a common body of liquid shown in Fig. 3.

Referring to claim 38, Fukuchi et al. teaches replacing an amount equal in volume to the ink that was ejected from the nozzles in [Col. 1, Lines 35-38].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the teaching of Fukuchi et al. with the printhead of Moon et al. for the purpose of preventing ink degeneration in the pressure chamber in [Col. 3, Lines 51-58].

14. Claims 43, 44, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38 and 42 above, and further in view of Silverbrook (US Pat. 5,841,452).

Moon et al. in view of Fukuchi et al. discloses the basic elements of the claimed invention except for being configured to print on a page and to be a page-width printhead of claims 6 and 25, wherein each heater element is configured such that an actuation energy of less than 500 nanojoules (nJ) is required to be applied to that heater element to heat that heater element sufficiently to form a said bubble in the bubble forming liquid thereby to cause the ejection of a said drop of claims 8 and 27, and a structure that is formed by chemical vapor deposition (CVD), the nozzles being incorporated on the structure of claims 13 and 32.

Referring to claims 6 and 25, Silverbrook teaches the printhead configured to print on a page and to be a page-width printhead in [Col. 2, Lines 28-31]. Referring to claims 8 and 27, Silverbrook teaches typically 200 nanojoules is required to eject a drop by heating the heater element in [Col. 18, Lines 15-18]. Referring to claims 13 and 32, Silverbrook teaches a thick chemical vapor deposition (CVD) glass over coat [142] which forms the nozzle region in [Col. 9, Lines 57-58] shown in Fig. 12.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the requirement of applying a typical heating energy of 200 nanojoules, and a nozzle plate formed by chemical vapor deposition (CVD) of Silverbrook to the heating element and printhead of Moon et al. in view of Fukuchi et al. for placing an image on a sheet in a single pass, maintaining print speed while reducing power dissipation, and to provide mechanical strength to resist the shock of exploding or collapsing vapor bubbles and to provide protection against the external environment in [Col. 8, Lines 22-25].

15. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38 and 42 above, and further in view of Feinn et al. (US Pat. 6,543,879).

Moon et al. in view of Fukuchi et al. discloses the basic elements of the claimed invention except for a nozzle density greater than 10000 nozzles/cm².

Feinn et al. of the acknowledged prior art teaches in [Col. 2, Lines 1-14] a nozzle packing density of at least 100 nozzles/mm², which is equal to 10000 nozzles/cm² when converted to square centimeters.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the nozzle density of Feinn et al. to the printhead of Moon et al. in view of Fukuchi et al. for the purpose of accommodating higher printing resolutions and to improve the printhead drop generation rate in [Col. 1, Lines 57-61].

16. Claims 47 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38 and 42 above, and further in view of Kubby (US Pat. 5,706,041).

Moon et al. in view of Fukuchi et al. discloses the basic elements of the claimed invention except for the heater element having two opposite sides and configured such that a gas bubble formed by the heater element is formed at both of the sides of the

heater element and the heater element substantially covered by a conformal protective coating, all sides of the coating being seamless.

Kubby teaches the heater element [20a and 20b] causing a gas bubble to be formed on both sides of the heater element [20a or 20b] in [Col. 4, Lines 59-63]. Kubby teaches a heater element [20a or 20b] that is substantially covered by a protective coating substantially to all sides, which are seamless in [Col. 4, Lines 32-50] shown in Fig. 4.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the elements taught by Kubby to the printhead of Moon et al. in view of Fukuchi et al. for the purpose of exposing both sides of the heater for vaporizing liquid ink, ejecting a sufficient amount of ink from the ejector, and protecting the heater.

17. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38 and 42 above, and further in view of Kashino et al. (US Pat. 5,534,898).

Moon et al. in view of Fukuchi et al. discloses the basic elements of the claimed invention except for a nozzle plate of the printhead having a thickness of less than 10 microns.

Kashino et al. of the acknowledged prior art teaches a thickness of an orifice plate in the order of several microns in [Col. 6, Lines 34-41].

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the thickness of the Kashino et al. nozzle plate to the Moon et al. in view of Fukuchi et al. printhead for the purpose of obtaining adequate values of the velocity of the discharged ink droplets, amount of ink droplet and refilling frequency, and in consideration of the distance between the thermal energy generating element and the discharge port.

18. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moon et al. (US 2002/0008732) in view of Fukuchi et al. (US Pat. 4,549,191) as applied to claims 38 and 42 above, and further in view of Chan (US Pat. 5,710,070).

Moon et al. in view of Fukuchi et al. discloses the basic elements of the claimed invention except for a heater element formed of solid material of which more than 90% of which, by atomic proportion, is constituted by at least one periodic element having an atomic number below 50.

Chan teaches a thermal inkjet printhead comprising a resistive layer composed of titanium nitride, which forms a resistor and a contact metal barrier layer in [Col. 2, Lines 10-14]. Titanium has an atomic number less than 50 on the periodic table.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the titanium nitride resistor to the printhead of Moon et al. in view of Fukuchi et al. for the purpose of having resistors that are more reliable, especially at higher temperatures and less complicated to manufacture.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Han S. Choi whose telephone number is (571) 272-8350. The examiner can normally be reached on Monday - Friday, 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2853

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HSC
9/13/06

 9/18/06
MANISH S. SHAH
PRIMARY EXAMINER